IN THE CLAIMS

1. (Presently Amended) Signal processing method using a MAP (Maximum A Posteriori) type algorithm to determine a likelihood ratio Λ_k^x of a set of states X of a lattice at instant k, each of the said states being associated with at least one intermediate variable, belonging to the group including a so-called "forward" variable and a so-called "backward" variable, propagated by the said MAP algorithm and calculated recursively, in a direct direction and in an indirect direction respectively at the said instant k with respect to the said lattice,~~.~~ wherein the method comprises:

~~characterised in that it includes a step for~~ reducing the number of states selected by the said MAP type algorithm so as to calculate the said likelihood ratio~~,~~; and

~~and in that for~~assigning at least one determined value ~~is assigned~~ to the corresponding said forward and/or backward variable, so as to calculate an approximate likelihood ratio, at least for some non-selected states.

2. (Presently Amended) Method according to claim 1, ~~characterised in that~~wherein at a given instant K, the said at least one determined value a(k) assigned to the said forward variable is such that $0 \leq a(k) \leq \underset{i \in M_k^f}{Min}(a_i^k)$, and/or the said at least one determined value b(k) assigned to the said backward variable is such that $0 \leq b(k) \leq \underset{i \in M_k^b}{Min}(\beta_i^k)$, where M_k^f and M_k^b represent a set of the said states selected in the said direct direction and in the said indirect direction respectively at the said instant k, and where a_i^k and β_i^k represent the said froward and backward variables respectively at the said instant k.

3. (Presently Amended) Method according to claim 2, ~~characterised in that~~wherein at a given instant k, the said determined value a(k) and/or b(k) is unique and is assigned to at least one forward variable a_i^k and/or backward variable β_i^k.

4. (Presently Amended) Method according to ~~any of claims 1 to 3, characterised in that~~claim 1, wherein a constant value is assigned to the said forward and backward variables respectively, such that the said MAP type algorithm is a single-directional direct or indirect type algorithm respectively.

5. (Presently Amended) Method according to ~~any of claims 1 to 4, characterised in that~~claim 1, wherein the said step to reduce the number of states uses a "breadth-first" type lattice search algorithm.

6. (Presently Amended) Method according to claim 5, ~~characterised in that~~wherein the said "breadth-first" type algorithm is an M type algorithm.

7. (Presently Amended) Method according to claim 5, ~~characterised in that~~wherein the said "breadth-first" type algorithm is a T type algorithm using at least one threshold.

8. (Presently Amended) Method according to claim 7, ~~characterised in that~~wherein the said at least one threshold is variable as a function of the said instant k.

9. (Presently Amended) Method according to claim 8, ~~characterised in that~~wherein a predetermined value is assigned to the said variable threshold for each instant k.

10. (Presently Amended) Method according to claim 8, ~~characterised in that~~wherein –for each instant k, the value of the said variable threshold is determined by the use of an

adaptive algorithm.

11. (Presently Amended) Method according to claim 10, ~~characterised in that~~wherein -the said adaptive algorithm is a gradient type algorithm.

12. (Presently Amended) Method according to ~~any of claims 10 and 11, characterised in that~~claim 10, wherein since the said lattice comprises a plurality of nodes each associated with one of the said states and at a given instant k, the value of the said variable threshold T at an instant (k+1) is determined by the following equation:

$$T(k+1) = T(k) - \mu(M(k) - M_c)$$

where T(k) represents the value of the said variable threshold at the said instant k, M_c is the target number of propagated nodes in the said lattice, M(k) is the number of propagated nodes in the said lattice at instant k, and μ is a positive constant representing a learning gain.

13. (Presently Amended) Method according to ~~any of claims 11 and 12, characterised in that~~claim 11, wherein the said adaptive algorithm is a gradient type algorithm with variable pitch.

14. (Presently Amended) Method according to ~~any of claims 12 and 13, characterised in that~~claim 12, wherein the said learning gain μ is a function of the said instant k.

15. (Presently Amended) Method according to ~~any of claims 2 to 14, characterised in that since the said "breadth first" type algorithm is an M type algorithm,~~claim 2, wherein the said step to reduce the number of states uses an M type "breadth-first" lattice search algorithm, and the said determined values a(k) and/or b(k) assigned to the said "forward" and/or "backward" variables respectively, at a given instant k are given by the following equations:

$$a(k) = \underset{i \in M_k^f}{Min}(a_i^k) - c_f$$

$$b(k) = \underset{i \in M_k^b}{Min}(\beta_i^k) - c_b$$

where c_f and c_b are two positive constants.

16. (Presently Amended) Method according to ~~any of claims 2 to 14, characterised in that since the said "breadth first" type algorithm is a T type algorithm,~~claim 2, wherein the said step to reduce the number of states uses a T type "breadth-first" lattice search algorithm, and the said determined values a(k) and/or b(k) assigned to the said forward and/or backward variables at a given instant k respectively, are given by the following equations:

$$a(k) = T^f(k) - c_f$$

$$b(k) = T^b(k) - c_b$$

where c_f and c_b are two positive constants, and where

$T^f(k)$ and $T^b(k)$ denote the value of the said variable threshold at said instant k in the said direct direction and in the said indirect direction respectively.

17. (Presently Amended) Method according to ~~any of claims 1 to 16, characterised in that~~ claim 1 the said MAP type algorithm belongs to the group ~~comprising~~consisting of:

-MAP type algorithms;

-Log-MAP type algorithms; and

-Max-Log-MAP type algorithms.

18. (Presently Amended) Method according to ~~any of claims 4 to 17, characterised in that~~claim 4, wherein since the said MAP type algorithm is a single-directional algorithm, the said method uses a step to compare decisions made by the said single-directional algorithm with the corresponding decisions made by a Viterbi type algorithm, called Viterbi decisions.

19. (Presently Amended) Method according to claim 18, ~~characterised in that~~ wherein in the case of a negative comparison for at least one of the said decisions made by the said single-directional algorithm, the said method uses a substitution step for the said Viterbi decision corresponding to the said decision made by the said single-directional algorithm, called the substituted decision.

20. (Presently Amended) Method according to claim 19, ~~characterised in that~~wherein a determined value V is assigned to the absolute value of the said likelihood ration associated with the said substituted decision.

21. (Presently Amended) Method according to claim 20, ~~characterised in that~~wherein the said determined value V is equal to the absolute value of the average likelihood ratio of the sequence.

22. (Presently Amended) Method according to claim 18, ~~characterised in that~~wherein in the case of a negative comparison for at least one of the said decisions made by the said single-directional algorithm, the said method uses a step for weighting the said likelihood ratio associated with the said decision considered, taking account of the said Viterbi decision.

23. (Presently Amended) Method according to claim 22, ~~characterised in that~~wherein when Y is a set of states associated with a decision D_i^Y output by the said Viterbi type algorithm at instant i, and Λ_i^y represents the likelihood ratio associated with Y at instant i as calculated by the said single-directional algorithm during the said weighting step, the value of Λ_i^y is replaced by the $\widetilde{\Lambda}_i^Y$ defined by $\widetilde{\Lambda}_i^Y = \Lambda_i^y + D_i^Y x V$, where V is a determined value.

24. (Presently Amended) ~~Method applicable, according to any of claims 1 to 23, to at least one of the domains belonging to the group comprising~~The method of claim 1 and further comprising performing said method in a domain belonging to the group consisting of:

-symbol detection;

-signal coding/decoding;

-turbo-decoding;

-turbo-detection; and

-source coding by quantification in lattice.

25. (Presently Amended) A communication~~Communication~~ signals receiver comprising means for implementing a MAP (Maximum A Posteriori) type algorithm to determine a likelihood ratio Λ_k^X of a set of states X of a lattice at instant k, wherein each of the said states ~~being~~is associated with at least one intermediate variable belonging to the group comprising a so-called "forward" variable and a so-called "backward" variable propagated by the said MAP algorithm and calculated recursively in a direct direction and in an indirect direction respectively at the said instant k with respect to the said lattice, wherein the means for implementing the MAP type algorithm further comprises:

~~characterised in that it comprises~~ means of reducing the number of states selected by the said MAP type algorithm in order to make a calculation of the said likelihood ratio,

~~and in that~~ for at least some non-selected states, means for assigning at least one determined value ~~is assigned~~ to the corresponding said forward variable and/or backward variable, so as to calculate an approximate likelihood ratio.